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ABSTRACT

Many low-income families are dependent on monthly allotments of Food Stamps for purchasing their groceries. To test the proposition that children in such families may eat more poorly as the end of the month nears, and thereby perform worse in school, 54 children attending 2nd and 3rd grades in an urban school were seen on 2 occasions. Diet records were kept for a day, and the children were subsequently tested with a battery of attention tasks. Results showed that children ate more poorly at the end of the month relative to the beginning, and that their performance on the tasks also appeared to be negatively affected. These results suggest that Food Stamp Programs may serve a critical function in helping nourish children, and that ensuring adequate resources for a full month's food supply is desirable. (Author)

Effects of Nutrient Intake on Task Performance in a Sample of Inner City Elementary School Children

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Abstract

Many low-income families are dependent on monthly allotments of Food Stamps for purchasing their groceries. To test the proposition that the children in such families may eat more poorly as the end of the month nears, and thereby perform worse in school, 54 children attending 2nd and 3rd grades in an urban school were seen on two occasions. Diet records were kept for a day, and the children were subsequently tested with a battery of attention tasks. Results showed that children ate more poorly at the end of the month relative to the beginning, and that their performance on the tasks also appeared to be negatively affected. These results suggest that Food Stamp Programs may serve a critical function in helping to nourish our children, and that ensuring adequate resources for a full month's food supply is desirable.

Introduction

Over the past 20 years, a growing body of research has shown that beyond its linkage to health, a child's diet may also influence aspects of behavior such as alertness, mood, and activity (Lozoff, 1989). Recent work has demonstrated that even short-term nutritional deficits, such as meal skipping, can negatively impact both school attendance and performance (Pollitt, 1995). In families with limited resources, a variation of this phenomenon may exist when meals of poorer quality may be routinely served or even missed entirely. To remedy this, the USDA Food Stamp Program dispenses coupons to eligible low-income families, so that the recipients may purchase nutritious food each month.

Purpose

Anecdotally, a number of urban teachers have observed that children whose families depend on such support seem to show declines in school performance from the beginning of the month to the end. Food Stamps are distributed at the beginning of each month, so poorer performance could be due to the quality of the children's diets deteriorating as the families run low on groceries over the course of the month. In the present study we wished to test this assumption, by examining low-income children's diet and task performance near the beginning and end of a month.

Methods

Participating children were drawn from the 2nd and 3rd grade classes of an urban public school, and were seen on the first and last full weeks of October. Following a class lesson by a nutrition educator that covered the instructions for completion, children were sent home with a diet record (as a homework assignment). The following morning, we collected the diet records and administered the test battery. Paper-and-pencil tasks that could be administered in a group format with verbal instructions were selected. The tasks were deliberately chosen based on their age-appropriate suitability—that is, they could conceivably be solved by any child of this age provided s/he paid attention and took her/his time. The battery consisted of: *Hidden Letters (Figure 1, Figure 2)*, *Hidden Figures*, finding *Numbers in a Field (Figure 3)*, a series of *Mazes (Figure 4, Figure 5)*, and a series of *Matching-to-Sample* figures (Figure 6, Figure 7). All tasks had a pre-set time limitation in order to ensure individual variation in success. Parallel forms were used at the second session.

Results

Usable protocols were obtained for 54 African-American children for whom two complete diet and test records were available. In terms of dietary quality, 20% of the children reported an intake that met the minimum daily serving requirements of the Food Guide Pyramid (Figure 8) at the beginning of the month, versus none of the children doing so at the end of the month. As shown in Figure 9, children also tended to have breakfasts in greater accord with the SBP Guidelines at the beginning than end of the month ($p < .07$). School Breakfast Program Guidelines recommend: 1 serving of milk; 1 serving of a fruit, vegetable, or full-strength fruit or vegetable juice; and 2 servings of a bread, meat, or bread or meat alternate.

Although task performance on all of the tasks could have been expected to improve through a practice effect, in fact 5 of the 10 tasks showed poorer results during the second testing, which is consistent with our hypothesis (Table 1). Children were less able to find the hidden letters or pictures at the second time of testing, though insignificant improvements were shown on some of the other tasks. Errors on the mazes were equivocal, as some mazes showed fewer errors and some showed more over time.

Conclusion

The results of this pilot study showed that children from low-income families may be at additional risk for school failure due to poorer nutritional intake. Assessing diet and performance on two occasions indicated that the children's diets appeared to have worsened over the course of the month, and their task performance showed a concomitant deterioration. In families who are dependent upon food stamps, this phenomenon may repeat itself every month. The policy implications of these results are that the Food Stamp Program provides an essential service, and that means for ensuring adequate nutrition for our children throughout each month should be pursued.

Figure 1

Figure 2

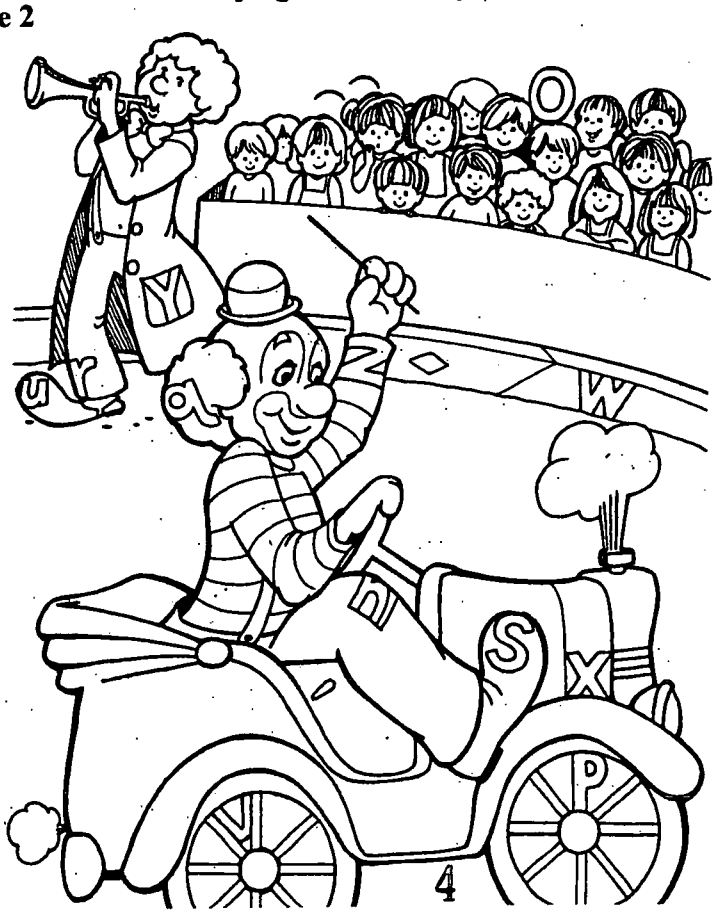


Figure 3

65 48 11 76 74	17 46 85 09 50	58 04 77 69 74	73 03 95 71 86	40 21 81 65 44
80 12 43 56 35	17 72 70 80 15	45 31 82 23 74	21 11 57 82 53	14 38 55 37 63
74 35 09 98 17	77 40 27 72 14	43 23 60 02 10	45 52 16 42 37	96 28 60 26 55
69 91 62 68 03	66 25 22 91 48	36 93 68 72 03	76 62 11 39 90	94 40 05 64 18
09 89 32 05 05	14 22 56 85 14	46 42 75 67 88	96 29 77 88 22	54 38 21 45 98
91 49 91 45 23	68 47 92 76 86	46 16 28 35 54	94 75 08 99 23	37 08 92 00 48
80 33 69 45 98	26 94 03 68 58	70 29 73 41 35	53 14 03 33 40	42 05 08 23 41
44 10 48 19 49	85 15 74 79 54	32 97 92 65 75	57 60 04 08 81	22 22 20 64 13
12 55 07 37 42	11 10 17 20 40	12 86 07 46 97	96 64 48 94 39	28 70 72 58 15
63 60 64 93 29	16 50 53 44 22	40 21 95 23 63	43 65 17 70 82	07 20 73 17 90
61 19 69 04 45	26 45 74 77 74	51 92 43 37 29	65 39 45 17 93	42 58 26 05 27
15 47 44 52 66	95 27 07 99 53	59 36 78 38 48	82 39 61 01 18	33 21 15 94 66
94 55 72 83 73	67 89 75 43 87	54 62 24 44 31	91 19 04 23 92	92 92 74 59 73
42 48 11 62 13	97 34 40 87 21	16 86 84 87 67	03 07 11 20 59	25 70 14 66 70
23 52 37 83 17	73 20 88 98 37	68 93 59 14 16	26 25 22 96 63	05 52 28 25 62
04 49 35 24 94	75 24 63 38 24	43 86 25 10 25	61 96 27 93 35	65 33 71 24 72
00 54 99 76 54	64 05 18 81 39	96 11 96 38 96	54 89 28 22 91	23 28 72 95 29
35 96 31 53 07	26 89 80 93 54	33 35 13 54 62	77 97 45 00 24	90 10 33 93 33
59 80 80 83 91	45 42 72 68 42	83 60 94 97 00	13 02 12 48 92	78 56 52 01 06
46 05 88 32 36	01 39 00 22 86	77 28 14 40 77	93 91 08 36 47	70 61 74 29 41

Figure 4

A Lucky Pearl

Help the diver find the pearl.

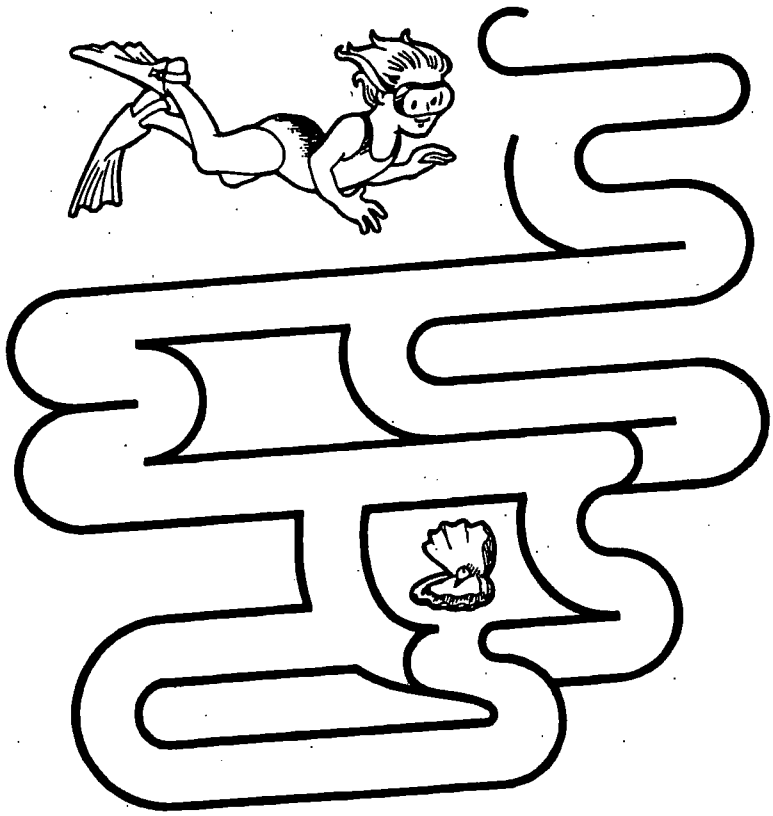


Figure 5

Play That Tune

Color the path to the notes.

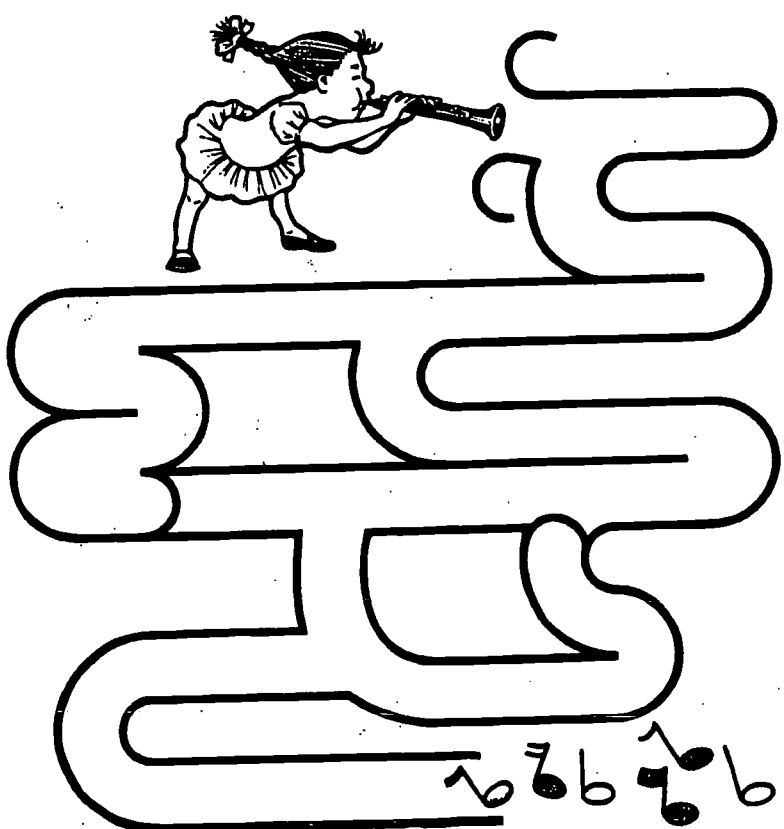


Figure 6

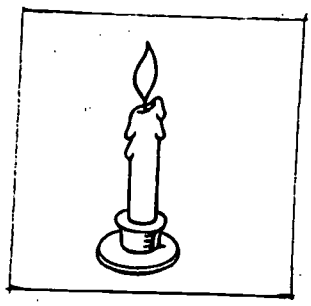
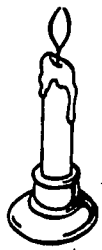
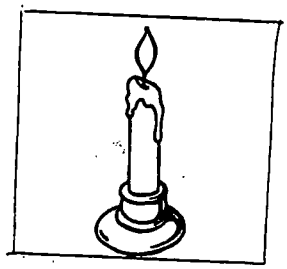
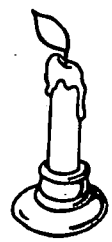


Figure 7







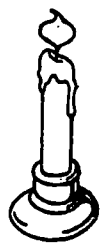
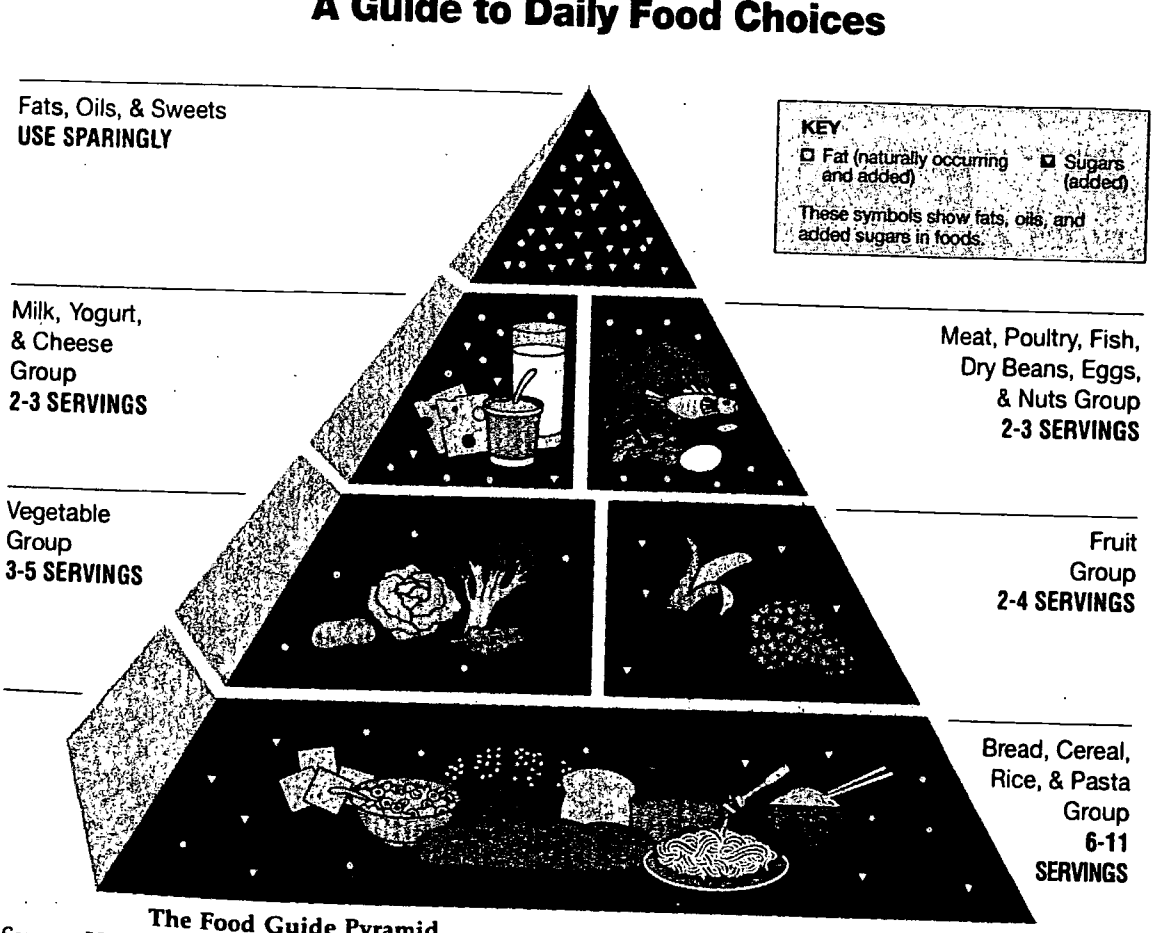


Figure 8



The Food Guide Pyramid.

Source: U.S. Department of Agriculture/U.S. Department of Health and Human Services.

Figure 9

Compliance with SBP and Food Pyramid

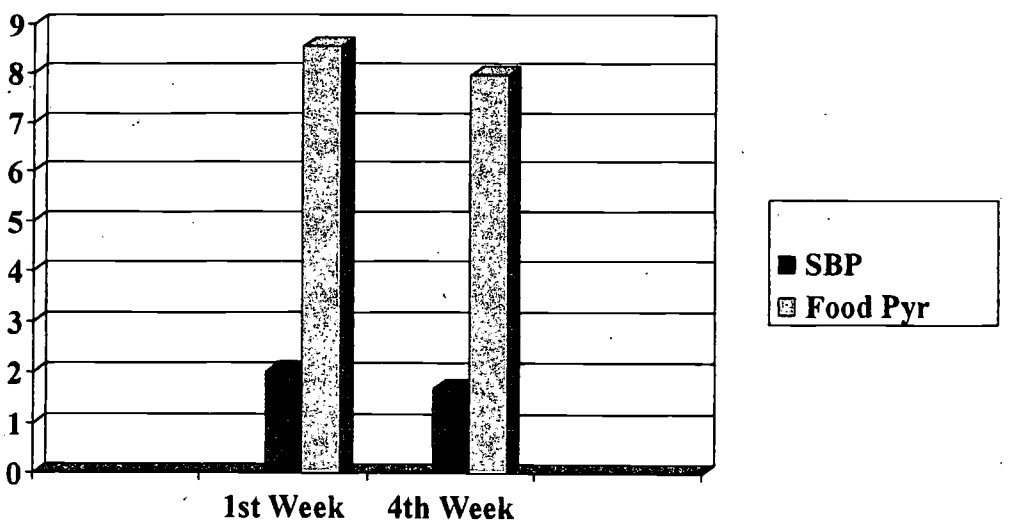


Table 1—Scores on Performance Tests

	First Week Mean (SD)	Fourth Week Mean (SD)	
Find-a-Letter	11.56 (1.57)	10.87 (1.89)	p<.03
Hidden Pictures	9.69 (.80)	7.39 (1.99)	p<.001
Numbers	7.93 (4.39)	8.70 (3.12)	
Match-to-Sample	8.56 (1.78)	8.81 (1.34)	
Maze 1*	.27 (.60)	.38 (.93)	
Maze 2	.56 (.80)	1.04 (3.12)	
Maze 3	.66 (1.56)	.47 (.97)	
Maze 4	.87 (1.07)	.91 (1.08)	
Maze 5	1.85 (1.55)	1.58 (1.26)	
Maze 6	1.65 (2.15)	1.02 (1.71)	

* Means for mazes indicate number of errors

Supported in part by a grant from the Food Stamp—Nutrition Education Program of New Jersey.

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Pollitt, E. (1995). Does breakfast make a difference in school? *Journal of the American Dietetic Association, 95*,1134-1139.

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